

SOV/130-59-1-6/21

Influence of some Technological Factors on the Quality of Structural Steel

percentage of ingots with blowholes as functions of aluminium consumption, g/tonne and duration of deoxidation, min, respectively). Replacement of preliminary deoxidation with 12% ferrosilicon by deoxidation in the ladle led to a reduction of gas-blowhole flawed ingots from 4.66 to 3.55% (23 heats). Trapping of skin in the metal during filling of the ingot mould was found to be a cause of blowholes: this could be reduced by increasing pouring speeds and eliminated by top pouring (Table 1). Examination of the non-metallic inclusions appearing in tyres and blanks during their mechanical working showed them to consist partly of the slag floating on the metal surface together with some hollow-ware debris. The authors conclude that curling of the skin directs the inclusions into the body of the ingot since traces of skin were found near non-metallic inclusions in blanks. Tests showed (Table 2) that with increasing ingot-mould filling speeds the incidence of large non-metallic inclusions decreases. With filling speeds of 700-800 mm/min these flaws are absent. But changes in deoxidizing practice did not

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affect the incidence of large non-metallic inclusions appearing in machining of blanks and tyres. Increasing mould filling speed was found to increase the incidence of longitudinal hot cracks (Table 3), which occurred mostly along corners. The use of a rounded ingot mould shape (Fig 3b) reduced this and higher filling speeds became possible (Table 4), but for complete elimination top-pouring through a tundish was necessary, and this increased the incidence of transverse cracks. It was found that pre-tapping metal temperatures in the furnace of 1620-1630°C (measured with platinum/platinum-rhodium immersion couples) corresponded to minimal longitudinal cracking in 30KhN3A steel. Surface tears during forging

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were closely linked with longitudinal cracks and were  
reduced by the same measures and also by slowing down  
the cooling of ingots by this steel.

There are 3 figures and 5 tables.

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18(5)

PHASE I BOOK EXPLOITATION 309/1907  
Abkhazskiy nauch Ukrainskiy SSR. Kiyev Otdeleniye tekhnicheskikh nauk

Voprosy proizvodstva stali vyzp. 5 (Problems of Steel Production, No. 5)  
Kiev, Izd-vo AN Ukrainskoy SSR, 1958. 137 p. Krata slip in-  
serted. 2,000 copies printed.

Red. Ed.: M. M. Kobachov, Academician, Ukr. SSR Academy of  
Sciences; Ed. of Publishing House: M. M. Labinova; Tech. Ed.:  
V. I. Yurishin.

REMARKS: This book is intended for engineers and scientific per-  
sonnel in the field of steel production.

CONTENTS: This is a collection of articles dealing with various as-  
pects of the production of steel, including the designing of open-  
hearth furnaces, thermal processes in the furnaces, thermodynamics  
of steel-making processes, technology of producing high-grade  
steel, and changes in the size and shape of ingots. Other topics  
discussed are the properties of chrome-manganese stainless steels,  
improvement of ball-bearing steel, ingot defects in cast steels,  
as determined by temperature of casting and shape of mold, and  
certain aspects of steel rolling. Some of the articles are ac-  
companied by references, both Soviet and non-Soviet.

"Dan, B. D., and E. P. Makovchuk. Investigation of the Pro- 41  
perties of Chrome-Manganese Stainless Steels

Prokhorenko, K. K., and E. V. Verkhovtsev. Improving the Quality 49  
of Manganese-Bearing Steel

Verkhovtsev, E. V., and K. K. Prokhorenko. Ingot Defects Caused 63  
by Skin Pits Forming During the Tempering of Steel

Prokhorenko, K. K., P. K. Rukhovich, E. V. Verkhovtsev, and V. A. 65  
Verkhovtsev. Athermic Mixture for Heating Hot Tops of Steel  
Castings

Yefimov, V. A., E. P. Sabiray, and V. P. Gribenjuk. Effect of the 77  
Hydrodynamics of the Inflow of Liquid Steel Into the Ingot Mold  
on Ingot Quality

Yefimov, V. A., V. I. Minin, M. P. Lapshov, V. P. Gribenjuk, and 87  
A. A. Kisilev. Effect of Tempering Temperature and Mold Shape on  
the Quality of Steel Ingots

Yefimov, V. A., E. P. Sabiray, and V. P. Gribenjuk. Reduction of Head 96  
and Butt Crops in the Rolling of Ingots 110

Yefimov, V. A., V. P. Gribenjuk, and A. M. Melniko. An Investigation 123  
of the Conditions for Rolling Sheet Bar With Wavy Surfaces

Pedorevich, V. G. Experiments in the Conversion of High-phos- 130  
phorus Pig Iron in a Converter With Side Blast of Oxygen

AVAILABLE: Library of Congress

80/4  
7-88-39

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18 (5, 7)

SOV/128-59-11-5/24

AUTHORS: ~~Prokhorenko, K.K.~~, Candidate of Technical Sciences,  
and Verkhovtsev, E.V., Engineer

TITLE: Improving the Quality of Precision Steel Castings

PERIODICAL: Liteynoye proizvodstvo, 1959, Nr 11, pp 10-11 (USSR)

ABSTRACT: Production of precision steel castings with the use of  
smelted models is performed at the Izhevsk Engineering  
Plant by application of models fashioned from a  
mixture of paraffin and stearin (70 : 30). The units  
are cast, chiefly, from carbon steels, brands 10-50 L.  
After the melting of metal, the slag is removed and  
ferromanganese, ferrosilicon and aluminum (0.1%) are  
added. When casting by using this method, the quality  
of the product received does not always meet the re-  
quirements due to the appearance of gas bubbles,  
cracks and other defects in the casting. These defects  
ensue owing to oxidation of iron as well as of ele-  
ments-deoxidizers - manganese, silicon and aluminum -  
by the oxygen contained in the air. In order to pre-

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Improving the Quality of Precision Steel Castings

vent the admission of oxygen, slags of different compositions were added to the open metal surface. The best results were obtained when a mixture of sand with soda (4 : 1) or sand with admixture of boric acid (1-1.5%) was used. There are 3 tables and 2 photographs.

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S/133/61/000/011/001/010  
A054/A127

AUTHORS: Dobrokhotoy, N. N., Active Member of the Academy of Sciences USSR,  
Prokhorenko, K. K., Candidate of Technical Sciences

TITLE: Improving the reducing and teeming technology of steel

PERIODICAL: Stal', no. 11, 1961, 995 - 998

TEXT: Investigations showed that the amount of globular inclusions in steel decreases if the amount of aluminum added during reduction is raised, because this reduces the ferro- and manganese oxides in these inclusions. At the Izhevsk Plant the amount of aluminum added for reduction of the  $\text{ШХ15}$  (ShKh15) ball-bearing steel was increased from 0.35 to 1.05 kg/ton of steel, which improved the quality of this grade. With about 1 kg aluminum/ton of metal the aluminum content in the finished metal will be about 0.04% and this is the optimum. If more is added, the ingot surface deteriorates. Increasing the aluminum addition during reduction yielded for ShKh15 steel the following results:

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Added in the ladle, g/t				
aluminum	200	200	500 - 600	500 - 600
calciumsilicon	1,250	-	1,250	1,250
Average index for				
sulfides	2.72	2.40	2.39	2.18
oxides	2.34	2.28	1.81	1.57
globules	2.24	1.81	1.76	1.26
Number of specimens (%) with				
index above 3 for				
sulfides	3.7	4.1	-	-
oxides	4.8	11.5	-	-
globules	1.2	-	-	-

The increased amount of aluminum as deoxidizer improves the quality of ShKh15 steel smelted both in electric and in acidic open-hearth furnaces. The quality of 30Xh2MFA (30KhN2MFA) forged structural steel containing chromium, nickel, molybdenum was improved by the addition of 1.5 kg aluminum/ton of steel. Too much aluminum in electric steel, however, results in the formation of nitrides precipitating at the grain boundaries and making the steel too brittle. Although tita-

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A054/A127

nium also forms nitrides, these are less harmful, since they do not solve in austenite. Therefore, the authors recommend to replace part of the aluminum by titanium, adding, for instance to structural steel titanium and aluminum at a ratio of 0.7 to 0.35 kg/ton steel. An increased aluminum consumption during reducing decreases the quantity of endogenous oxides but may raise the quantity of exogenous inclusions. Aluminum deoxidizers make the skin thicker and rougher. When this skin cracks, its particles mix with the material of the ingot and impurify it. This can be prevented by increasing teeming rate. The more aluminum is added for reduction, the greater the teeming rate should be. This, however, increases the danger of hot crack formation, which can be prevented if molds with a corrugated inner surface are used and by pouring exactly in the center of the mold and decreasing the sulfur and hydrogen content of the metal. The effect of the teeming rate on the amount of impurities in ShKh15 steel is shown in a table. The amount of nonmetallic inclusions in ball-bearing steel can be decreased by using white slag for reduction instead of carbide-containing slag. The less calcium carbide is in the slag, the smaller the extent of carburization of the metal in the ladle and the smaller the amount of nonmetallic inclusions. In electric smelting the reduction process is to desulfurize the steel, which is effected by adding the required amount of aluminum. The reduction period can,

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therefore, be reduced to 30 minutes, without the purity of the metal being affected as to nonmetallic inclusions. Sulfur can be removed efficiently if the metal is mixed in the ladle with basic reducing slag containing the lowest possible amount of ferro-oxides. Steels with a high aluminum, titanium and chromium content are subjected to intense secondary oxidation, when poured into the mold. This results in a great amount of nonmetallic inclusions, while cracks and films appear on the billets and sheets rolled from such ingots. To prevent secondary oxidation, at the "Krasnyy Oktyabr" Plant the metal is poured into the mold under a liquid flux. The best flux was obtained by smelting in an electric furnace a mixture consisting of 35% chamotte, 25% lime and 40% fluorspar. In bottom casting about 10 kg flux is put in the mold as soon as the metal appears in it. The flux floats on the metal surface and prevents its oxidation. When liquid fluxes are used during pouring, the quality of steels reduced with aluminum can be improved considerably. There are 2 tables and 3 Soviet-bloc references.

ASSOCIATION: Institut ispol'zovaniya gaza, Akademiya Nauk Ukrainskaya SSR (Institute of Gas Utilization of the Academy of Sciences of the Ukrainian SSR)

Card 4/4

PROKHORENKO, Kim Kondrat'yevich, kand. tekhn. nauk; DOBROKHOTOV,  
N.N., akademik, red.; ZINGER, S.L., red. izd-va; MIKHAYLOVA,  
V.V., tekhn. red.

[Slag conditions in steel smelting] Shlakovyĭ rezhim pri vyp-  
lavke stali. Moskva, Metallurgizdat, 1962. 242 p.

(MIRA 15:10)

1. Akademiya nauk Ukrainskoy SSR (for DobrokhotoV).  
(Steel—Metallurgy) (Slag)

YEMEL'YANENKO, Yu.G.; PROKHORENKO, K.K.; TYUTINA, A.Ye.

Electrolytic separation of nonmetallic inclusions in stainless steel. Vop. proizvod. stali no.9:73-78 '63. (MIRA 16:9)

PROKHORENKO, K.K.; SVISTUNOV, A.M. [deceased]; VVEDENSKIY, V.S.; VERKHOV-  
TSEV, E.V.; YEMEL'YANENKO, Yu.G.; NAKONECHNYI, N.F.; PASTUKHOV,  
V.N.

Improving the technology of smelting and pouring stainless  
steel. Vop. proizvod. stali no.9:51-64 '63. (MIRA 16:9)

ISHCHUK, N.Ya., kand. tekhn. nauk; PROKHORENKO, K.K., kand. tekhn. nauk; YEMEL'YANENKO, Yu.G., inzh.

Using exothermic mixtures to obtain slag during steel pouring. Met. i gornorud. prom. no.5:72-75 S-0 '63.  
(MIRA 16:11)

1. Institut ispol'zovaniya gaza AN UkrSSR.

PROKHORENKO, K.K.; ISHCHUK, N.Ya.

Seventh Conference on the Physical and Chemical Principles  
of Steelmaking. Met. i gornorud. prom. no.6:78 N-D '65.  
(MIRA 18:12)

L 27615-66 ENT(m)/EWA(d)/ENP(t)/ETI IJP(c) JD  
 ACC NR: AP6018478 SOURCE CODE: UR/0133/66/000/003/0219/0223 40  
 AUTHOR: Nosov, V. A. (Engineer); Ishbhtuk N. Ya. (Candidate of technical sciences); 39  
 Isupov, V. F. (Engineer); Prokhorenko, K. K. (Candidate of technical sciences); B  
 Sulman, L. Ya. (Engineer); Ulagolanko, V. V. (Engineer); Solyanikov, B. G. (Engineer)  
 ORG: Metallurgical Combine im. A.K. Serov (Metallurgicheskii kombinat); Institute of  
 Casting Problems, AN SSSR (Institut problem lit'ya AN SSSR)  
 TITLE: Pouring steel under molten slag produced by combustion of an exothermic 4  
 mixture 18  
 SOURCE: Stal', no. 3, 1966, 219-223  
 TOPIC TAGS: cast steel, slag, metal pipe/38KhMYuA cast steel, 12Kh1MF cast steel,  
 20P cast steel, 15 GS cast steel, 38KhA cast steel, 38KhS cast steel, 40-45 KhN cast  
 steel, ShKh15 cast steel, 35KhGSA cast steel, 55S2 cast steel, 60S2 cast steel,  
 38KhGS cast steel  
 ABSTRACT: The paper is a report on a method developed in 1962 at the Metal-  
 lurgical Combine imeni A. K. Serov for pouring steel under molten slag produced  
 directly in the molds by combustion of an exothermic mixture. The first type  
 of steel cast by this method was 38KhMYuA. The method is presently being used  
 for pouring the following types of steel: 12Kh1MF, 20P, 15GS, 38KhA, 38KhS,  
 40-45KhN, ShKh15, 35KhGSA, 55S2, 60S2, and 38KhGS. The exothermic mixture has  
 the following composition (wt %): magnesium powder -- 2.5; aluminum powder --  
 UDC: 669.18.046.558.7  
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L 27615-66

ACC NR: AP6018478

4.5; sodium nitrate -- 11; oxidized manganese ore -- 20; fluorite -- 20; impure sodium disilicate -- 20; blast-furnace slag -- 12. It is shown that the production of liquid slag directly in the molds by combustion of this exothermic mixture gives the simplest means for casting under molten slag in mass production conditions. Scrap of finished products (blanks) are considerably reduced for surface defects when steel is poured under slag (particularly for 38KhMYuA steel where rejects are reduced by a factor of 32.5). This pouring method also reduces the work required for trimming blanks which increases the yield of bar stock for ShKh15 and 38KhS steel by 10 and 15% respectively. When metal poured under slag is used for pipe production, the pierceability of the blanks is improved and mechanical damage to the outside and inside surfaces is sharply reduced. A. A. Chepurnova participated in the work. Orig art. has: 5 tables and 3 figures. /JPRS/

SUB CODE: 11, 13 / SUBM DATE: none / ORIG REF: 003

Card 2/2 CC

ISHCHUK, N.Ya. (Kiyev); PROKHORENKO, K.K. (Kiyev)

Determining aluminum consumption for the decoxidation of steel.  
Izv. AN SSSR. Met. no.1:59-61 Ja-F '65. (MIRA 18:5)

L 51384-65 EWT(m)/EWP(t)/EWP(b) JD

ACCESSION NR: AP5010907

UR/0286/65/000/007/0095/0096

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B

AUTHOR: Nosov, V. A.; Ishchuk, N. Ya.; Isupov, V. F.; Prokhorenko,  
K. K.; Sukhman, L. Ya.; Glagolenko, V. V.

TITLE: Exothermic mixture for producing synthetic slag. Class 31, No. 5976 ;

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 95-96

TOPIC TAGS: synthetic slag, synthetic slag mixture

ABSTRACT: This Author Certificate introduces an exothermic slag-forming mixture which is added into ingot molds. To improve the surface of ingots, the mixture consists of 2.0—2.5% magnesium powder.

ASSOCIATION: none

SUBMITTED: 28May62

ENCL: 00

SUB CODE: MM

NO REF SOV: 000

OTHER: 000

ATD PRESS: 4006

Can

L 24714-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) IJP(c)/ASD(f)-3/ASD(m)-3/AFMDC MJW/  
JH/JG

ACCESSION NR: AR5000603

S/0137/64/000/008/1069/1069

SOURCE: Ref. zh. Metallurgiya. Sv. t., Abs. 81442

AUTHOR: Nakonechnyy, N. F.; Prokhorenko, K. K.; Zhdanov, P. L.

TITLE: Increasing the ductility of stainless steels using rare

nauchno-tekhn. sb., no. 1(25), 1964, 32-33

TOPIC TAGS: cerium containing alloy, rare earth containing alloy,  
metal ductility, stainless steel/ steel 10Kh16N25N13, steel  
07Kh25N13, steel 10Kh16N25M6, steel 07Kh25N13

TRANSLATION: The possibility of increasing the ductility of steels  
10Kh16N25M6 and 07Kh25N13 by the introduction of cerium has been  
studied. The ductility of cast metal test samples was tested by  
hammer forging, a bending test, and by rolling ingots weighing 0.7  
tons in a blooming mill, while the ductility of a deformed sample was  
determined by a short term elongation test at 1000-1250°. With the

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L 24711-65

ACCESSION NR: AR5000603

introduction of an optimum (0.1-0.2%) amount of cerium into deformed steel 10Kh16N25M13, an increase of 25-35% was obtained in  $\delta$  and  $\psi$  while in steel 07Kh25N13 only  $\psi$  increased. An increase of 9% in yield of usable metal was achieved in rolling industrial ingots, into which a calculated 0.2% of cerium had been introduced before tapping or into the ladle before pouring the metal.

SUB CODE: MM

ENCL: 00

Card 2/2

L 20085-65 EWT(m)/EWP(t)/EWP(b) JD/MLK

ACCESSION NR AM1049548

BOOK EXPLOITATION

S/ BT/

Prokhorenko, Kim Kondrat'evich; Verkhovtsev, Emil' Vladimirovich; Bakumenko, Sergey Pantel'evich; Vasil'yev, Nikolay Yeforovich; Ishchuk, Nikolay Yakovlevich; Fadeyev, Ivan Gavrilovich; Nosov, Viktor Aleksandrovich; Somenenko, Petr Pimenovich; Isupov, Vasil'y Fedorovich

6  
Melting and pouring of quality steels (Vyplavka i razlivka kachestvennykh staley), Moscow, Izd-vo "Metallurgiya", 1964, 200 p. illus., biblio. Errata slip inserted. 2,450 copies printed.

TOPIC TAGS: quality steel, steel teeming, steel melting, metallurgical furnace

PURPOSE AND COVERAGE: This book reports on the results of work on improving the technology of melting, deoxidation, and teeming of quality steels in electric arc, acid and basic open-hearth furnaces conducted at the Izhevsk Metallurgical Plant and the Serovsk Metallurgical Combine. Great attention is given to description of the measures to reduce contamination with nonmetallic inclusions of ball bearing and structural steels, presentation of material on the effectiveness of teeming steel under a liquid slag, and to increasing the output of sound metal from the ingots due to the use of various methods of heating their hot top. The results of using rare earth elements for deoxidation and modification of steel are given.

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L 20086-65

ACCESSION NR AM1049548

The book is intended for engineers and technicians working in the production of quality steels and can also be useful to students of higher educational institutions.

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SUB CODE: MM

OTHER: 003

SUBMITTED: 25Apr64

NR REF SOV: 044

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L 15200-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) ASD(f)-2/ASD(m)-3/AFMDC/ESD(gs) MJW/  
JE/JG/MLK  
ACCESSION NR: AT4048715 S/0000/64/000/000/0209/0213

AUTHOR: Vvedenskiy, V. S., Prokhorenko, K. K., Zhdanov, P. L., Semenchko,  
G. V., Vasil'yev, N. Ye., Verkhovtsev, Z. V., Nakonechny'y, N. F. B

TITLE: A study of the effect of rare earth metals on the quality of stainless steels and  
steel R18 27 A

SOURCE: Vsesoyuznoye soveshchaniye po splavam redkikh metallov, 1963. Voprosy\*  
teorii i primeneniya redkozemel'nykh metallov (Problems in the theory and use of rare-  
earth metals); materialy\* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 209-213

TOPIC TAGS: rare earth metal, stainless steel, cerium modifier, steel plasticity,  
austenite-carbide steel, austenite-ferrite steel, ferrocetium, steel inclusion, cerium  
hardness/steel R18

"APPROVED FOR RELEASE: 06/15/2000

CIA-RDP86-00513R001343120008-9

increased productivity during the war

Card 1/3

APPROVED FOR RELEASE: 06/15/2000

CIA-RDP86-00513R001343120008-9"

L 15200-65

ACCESSION NR: AT4048715

plasticity, owing to the formation of specific defects near the surface in the transcrystal-  
line zone consisting of accumulations of small inclusions, possibly cerium oxides and sul-  
fides. In the 10Kh16N25M6 steel, such addition led to a change in the distribution of car-  
bides in the cast metal, owing probably to a decrease in carbon solubility; an increase in  
cerium favored carbide segregation throughout the grains rather than at their boundaries,  
leading to a more even distribution of carbides in the outer ingot layers. Such addition had  
no significant influence on the amount of the alpha phase and its distribution in the  
07Kh25N13 steel. Its introduction led to a new form of non-metallic dot-like inclusions,  
apparently cerium oxysulfides, accumulating unevenly in the steel. Increasing the cerium  
addition led to a sharp decrease (to almost complete disappearance) of manganese and iron  
sulfides and silicates. Cerium modification of the 10Kh15N25M6 steel at a 0.15-0.20%  
level improved exterior and interior plasticity and increased the yield

did not increase the yield. Orig. art. has: + 185000

Card 2/3

L 15200-65  
ACCESSION NR: AT4048715

ASSOCIATION: None

SUBMITTED: 13Jun64

ENCL: 00

SUB CODE: MM

NO REF SOV: 000

OTHER: 000

Card 3/3

L 15196-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD(f)-2/ASD(m)-3/  
AFMDC/ESD(gs) MJW/JD/HW/JG/MLK  
ACCESSION NR: AT4048719 S/0000/64/000/000/0232/0237

AUTHOR: Nakonechny'y, N. F., Prokhorenko, K. K.

TITLE: The effect of rare earth metals on the plasticity and structure of stainless steels<sup>B</sup>

SOURCE: Vsesoyuznoye soveshchaniye po splavam redkikh metallov, 1963. Voprosy\*  
teorii i primeneniya redkozemel'nykh metallov (Problems in the theory and use of rare-  
earth metals); materialy\* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 232-237

TOPIC TAGS: rare earth metal, stainless steel, steel structure, steel plasticity,  
carbide steel, alloy steel, ferrocerium, steel inclusion

ABSTRACT: To prevent losses caused by the low plasticity of stainless steel ingots  
(tabulated), the plasticity of the transcrystalline and equiaxial crystal structures was  
investigated for 10Kh16N25M6 (carbide)

ing to 0.1-0.4% cerium to the molten steel was tested by pouring

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ACCESSION NR: AT4048719

periods of time. A 0.2-0.3% addition increased plasticity; this effect was more pronounced in single-phase austenitic steel. The structure was also studied after quenching at various temperatures. No significant influence of cerium upon the macrostructure of

ADDITIONS WILL INCREASE THE COMPLETION OF THE ABOVE SAID WORK. Page 2 of 3.

3 tables and 2 figures.

ASSOCIATION: None

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L 15196-65  
ACCESSION NR: AT4048719

SUBMITTED: 13Jun64

ENCL: 00

SUB CODE: MM

NO REF SOV: 004

OTHER: 001

Card 3/3

PROKHORENKO, K.K., kand.tekhn.nauk; YEMEL'YANENKO, Yu.G.; MAKONECHNYI, N.F.;  
VVEDENSKIY, V.S.

Production of stainless steel with the use of high-carbon ferrochromium.  
Met.i gornorud. prom. no.6:20-23 N-D '63. (MIRA 18:1)



NAKONECHNYI, N.F.; PROKHORENKO, K.K.; ZHDANOV, P.L.

Increasing the plasticity of stainless steel ingots with  
the help of rare-earth elements. Met. i gornorud. prom.  
no.1:32-33 Ja-F '64. (MIRA 17:10)

PROKHORENKO, K.Ya. (s.Timanivka, Tul'chinskogo rayonu, Vinnits'koy oblasti)

The seven-year plan of a collective farm. Nauka i zhyttia 9  
no.5:30-32 My '59. (MIRA 12:9)  
(Collective farms)

1-35427-65

ACCESSION NR: AP5008597

S/0300/65/037/001/0051/0055

AUTHOR: Prokhorenko, L. G.

TITLE: Effect of inhaling gas mixtures of various composition on the content in the animal brain of ammonia, glutamine, glutamic acid, and ATP

SOURCE: Ukrayins'kyi biokhimichnyy zhurnal, v. 37, no. 1, 1965, 51-55

TOPIC TAGS: brain, brain tissue, inhalation, toxic gas, toxic substance

ABSTRACT: The object of the present investigation was to determine the exchange of substances in brain tissue after inhalation of various harmful gaseous mixtures occurring in coal mines and causing accidents. The author investigated the brains of rats for their content of ammonia, amide nitrogen of glutamine, glutamic acid nitrogen, and ATP phosphorus after inhalation of gas mixtures containing methane.

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L 35427-65

ACCESSION NR: AP5008597

ASSOCIATION: Kafedra biokhimiyi Donets'koho medychnoho instytutu (Department of Biochemistry, Donets Medical Institute)

SUBMITTED: 22Feb64

ENCL: 00

SUB CODE: IS

NO REF SOV: 010

OTHER: 001

Card 2/2

PROKHORENKO, L. N.

"Selective Fertilisation in Maize, Pollinated with Mixtures Containing Unequal Amounts of Components." (p. 96) by Prokhorenko, L. N.

SO: Journal of General Biology XII (Zhurnal Obshchei Biologii) Vol. XII, No.2, 1951.

SHNAYDMAN, L.O.; SILING, M.I.; Prinimala uchastiye: PROKHORENKO, L.V.

Studies in the production of pyridinecarboxylic acids. Report No.  
2: Synthesis of isocinchomeric acid by oxidation of 2-methyl-5-  
ethylpyridine nitric acid under atmospheric pressure. Trudy  
VNIVI 8:5-11 '61. (MIRA 14:9)

1. Khimiko-tekhnologicheskaya laboratoriya Vsesoyuznogo nauchno-  
issledovatel'skogo vitaminного instituta.  
(Isocinchomeric acid)

STADNIK, Aleksey Nikolayevich; PROKHORENKO, Mariya Fedorovna

[Trade unions in the Ukraine up to the Great October Socialist  
Revolution] Profsciuzy Ukrainy do Velikoi Oktiabr'skoi  
sotsialisticheskoi revoliutsii. Moskva, Profizdat, 1959.  
140 p. (Ukraine--Trade unions) (MIRA 14:3)

PROKHORENKO, M. I.

Late results of the treatment of certain skin diseases with  
radioactive phosphorus. Vest. dermat. i ven. 34 no.1:42-44 Ja '60.  
(MIRA 1/12)

1. Iz Dnepropetrovskogo oblastnogo kozhno-venerologicheskogo dispansera.

(PHOSPHORUS—ISOTOPES) (SKIN—DISEASES)



PROKHORENKO, M.I. (Krasnoyarsk)

Combination type water heaters. Vod.i san.tekh. no.3:21-24  
Mr '60. (MIRA 13:6)

(Water heaters)

PROKHORENKO, M.I.

Repeated Wassermann examination of pregnant women is not  
necessary. Vest.derm.i ven. no.1:62 '62. (MIRA 15:1)

1. Dnepropetrovskiy oblastnoy kozhno-venerologicheskoy dispanser.  
(SYPHILIS—DIAGNOSIS—WASSERMANN REACTION)  
(PREGNANCY)

PROKHOROVKO, M.I.

Conference of dermatovenereologists of the Ukrainian S.S.R. Vest.  
derm. i ven. 31 no.6:55 H-D '57. (MIRA 11:3)  
(UKRAINE--DERMATOLOGY--CONGRESSES)

L 63224-65

ACCESSION NR: AT5017448

UR/2599/65/000/052/0070/0076

AUTHORS: Prokhorenko, M. M.; Rayevskiy, A. N.

TITLE: A rare case of intense hail in the Odessa region

SOURCE: Kiev. Ukrainskiy nauchno-issledovatel'skiy  
gidrometeorologicheskii institut. Trudy, no. 52, 1965. Voprosy klimatologii (Prob-  
lems in climatology), 70-76

TOPIC TAGS: hail, weather forecasting, anticyclone

ABSTRACT: This paper is essentially a description of an intense fall of hail in  
the Odessa region on Feb. 14-15, 1963. Hail stones 50 mm in diameter were ob-  
served. No stones exceeding 15 mm had been previously recorded in the Odessa  
region.

Card 1/2

L 63224-65

ACCESSION NR: AT5017448

2  
validity of the synoptic method. Continuous generation of ice in the atmosphere went on for 20 hours and 20 minutes, and the ice lasted on wires and other objects for 17 hours and 30 minutes longer. February was warmer than usual in the Odessa region (0.9°C warmer for a daily average), and precipitation was 102.2 mm, six times normal. Orig. art. has: 3 figures.

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy  
gidrometeorologicheskii institut, Kiyev (Ukrainian Scientific Research  
Hydrometeorological Institute) 55

SUBMITTED: 00

ENCL: 00

SUB CODE: ES

NO REF SOV: 005

OTHER: 000

Card 2/2

PROKHORENKO, M.M.; RAYEVSKIY, A.N.

Rare case of an intensive sheet of glaze in Odessa Province. Trudy  
UkrNIGMI no.52:70-76 '65. (MIRA 18:10)

PROKHORENKO, V.I.

Fourier series from functions of even or odd extensions. Vest.  
Mosk.un.Ser.1: Mat., mekh. 20 no.5:11-22 S-O '65. (MIRA 18:9)

1. Kafedra teorii funktsiy i funktsional'nogo analiza.

PROKHORENKO, V.K.

AUTHORS: Prokhorenko, V.K., and Fisher, I.Z.

46-4-2-18/20

TITLE: On the Molecular Theory of Sound Velocity in Liquids  
(K molekulyarnoy teorii skorosti zvuka v zhidkostyakh)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol IV, Nr 2, pp. 204-205 (USSR)

ABSTRACT: In an earlier note (Ref 1) I.Z. Fisher dealt with an exact calculation of velocity of sound in a unidimensional model of a liquid expressed in terms of molecular characteristics of this liquid. The present note deals with a 3-dimensional liquid consisting of hard non-interacting spheres, with an arbitrary value of density (Refs 2, 3). Such a model represents really a strongly compressed gas, rather than a liquid. Nevertheless, it is one of the few problems which can be solved exactly and completely. The authors find that the velocity of sound in the liquid considered increases with increase of density. At the highest possible values of the relative density  $v_0/v$ , where  $v_0$  = volume of one sphere (molecule) and  $v$  = mean volume per single sphere, the sound velocity is about 5 times the value of velocity in an ideal gas. There are 1 figure and 5 references, 4 of which are Soviet and 1 American.

Card 1/1

ASSOCIATION: Belorusskiy gosudarstvennyy universitet, Minsk (Belorussian State University, Minsk)

SUBMITTED: January 31, 1958

1. Sound-Velocity-Theory 2. Liquids-Applications



L 9681-66 EWT(m)/EWP(t)/EWP(b) JD/WB

ACC NR: AP5027597

SUB CODE: UR/0135/65/000/011/0008/0009

AUTHOR: Asnis, Ye. A. (Engineer); Prokhorenko, V. M. (Engineer); Shvindlerman, L. S. (Engineer) 44.55 44.55 44.55 50 51 52

ORG: [Asnis, Prokhorenko] Kiev Bol'shevik Plant (Kiyevskiy zavod "Bol'shevik"); [Shvindlerman] PKTI, Kiev 44.55 50 51 52

TITLE: Mechanism of crack formation during the welding and buildup of copper onto steel 44.55 18

SOURCE: Svarochnoye proizvodstvo, no. 11, 1965, 8-9

TOPIC TAGS: molten copper, steel, crack propagation, austenitic steel, ferritic steel, heat stress / 0Kh17T monophasе ferrite steel 44.55 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

ABSTRACT: The interaction of molten copper with steel, particularly during buildup and welding, results in the formation of copper-filled cracks. This is due to the cleavage effect of molten copper as well as to the special energy state of the melt at the grain boundaries and the consequent, enhanced diffusion of liquid-phase atoms through the crystal lattice of solid metal. A recent study (Asnis, Ye. A., Zamkov, V. N. Svarochnoye proizvodstvo, 1961, no. 7) revealed that the presence of a ferrite phase in steel reduces, or -- if the ferrite content exceeds 30% -- eliminates the penetration of steel by copper in such cases. Accordingly, the authors present some

Card 1/3

UDC: 621.791.92.011:669.35:669.15-194

2 9681-56

ACC NR: AP5027597

2

conclusions based on an experimental investigation of the mechanism of action of ferrite on crack formation, as well as of the general causes of crack formation, following the examination of microsections taken from welded specimens. It was found that the buildup of copper onto  $\Phi$ Kh17T monophasic ferrite steel did not result in any cracks whatsoever. Hence the hypothesis is offered that the cracks forming during the buildup of copper onto steel are produced by the combined action of the penetration of molten copper into the microfissures arising during the crystallization of the matrix phase -- steel (the Rebinder effect) -- and the attendant thermal tensile stresses. The Rebinder effect (cf. P. A. Rebinder. Fiziko-khimicheskiye issledovaniya protsessov deformatsii tverdykh tel. Yubileyny sbornik, posvyashchennyy 30-letiyu Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii. Izd. AN SSSR, 1947) is contingent on the penetration of molten copper into the capillary microfissures and hence also on the wetting of the capillary walls. Of the two phases present in steels, the  $\gamma$ -phase (austenite) is wetted by molten copper, but the  $\alpha$ -phase (ferrite) is not. Hence, it may be assumed that the failure of cracks to propagate through the ferrite phase is due to the nonwettability of this phase with respect to copper. Further, to assess the effect of the thermal stress factor on crack formation, copper was welded onto 10 mm specimens of St.3 steel preheated to 900-950°C (above the temperature of austenite formation). In this case, the preheating reduced to a minimum the thermal tensile stresses and the formation of austenite provided favorable conditions for the penetration of copper into the microfissures. Yet no cracks were detected following the buildup. This as well as other, similar experiments which produced the same results,

Card

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L 9681-66

ACC NR: AP5027597

indicates that the Rebinder effect alone is not enough to cause crack formation:  
the presence of thermal tensile stresses is also a prerequisite. Further, it was  
established that the cleavage effect of molten copper on steel, as calculated in  
terms of capillary pressure, is  $\sim 2.5 \text{ kg/mm}^2$ . Orig. art. has: 4 figures, 1 formula.

SUB CODE: 11,13/ SUBM DATE: none/ ORIG REF: 006/ OTH REF: 001

Card 3/3

L 10298-63

EWf(q)/EWf(m)/BDS--

AFFTC/ASD--JD/HW-2

ACCESSION NR: AP3001121

S/0125/63/000/007/0086/0089

AUTHOR: Asnis, Ye. A.; Prokhorenko, V. M.

TITLE: Peculiarities of welding copper to type 18-8 chromium-nickel austenitic steels

SOURCE: Avtomaticheskaya svarka, no. 7, 1963, 86-89

TOPIC TAGS: 18-8 steel, Kh18Ni10T steel, OKh21Ni5T steel, copper-steel welding

ABSTRACT: Formerly it was considered impossible to obtain a reliable weld between copper and stainless steel by electric-arc welding. The purpose of the investigation was to develop techniques for manual arc welding of M3 copper to Kh18Ni10T chromium-nickel and OKh21Ni5T low-nickel steels. Welding experiments were carried out on 300 x 100 x 10 and 300 x 100 x 5-mm plates; the experiments were interesting for chemical industries. Eight types of electrodes were tested. Attempts to use austenitic electrodes resulted in cracked welds. "Komsomolets-100" copper electrodes and "Progress-50" nickel electrodes caused no cracks but yielded porous welds. The best results in terms of mechanical properties of the weld were obtained from the OKh21Ni5T austenitic electrode with ENTU-3 coating. The copper edge to be welded was nickel-faced. No crack or pore was observed in the weld and the weld-affected zone. Orig. art. has: 5 figures and 1 table.

Card 1/2/

57  
56

ACC NR: AP5027597

SUB CODE: UR/0135/65/000/011/0008/0009

AUTHOR: Asnis, Ye. A. (Engineer); Prokhorenko, V. M. (Engineer); Shvindlerman, L. S. (Engineer)

ORG: [Asnis, Prokhorenko] Kiev Bol'shevik Plant (Kiyevskiy zavod "Bol'shevik"); [Shvindlerman] PKTI, Kiev

TITLE: Mechanism of crack formation during the welding and buildup of copper onto steel

SOURCE: Svarochnoye proizvodstvo, no. 11, 1965, 8-9

TOPIC TAGS: molten copper, steel, crack propagation, austenitic steel, ferritic steel, heat stress /  $\phi$ Kh17T monophasic ferrite steel

ABSTRACT: The interaction of molten copper with steel, particularly during buildup and welding, results in the formation of copper-filled cracks. This is due to the cleavage effect of molten copper as well as to the special energy state of the melt at the grain boundaries and the consequent, enhanced diffusion of liquid-phase atoms through the crystal lattice of solid metal. A recent study (Asnis, Ye. A., Zamkov, V. N. Svarochnoye proizvodstvo, 1961, no. 7) revealed that the presence of a ferrite phase in steel reduces, or -- if the ferrite content exceeds 30% -- eliminates the penetration of steel by copper in such cases. Accordingly, the authors present some

Card 1/3

UDC: 621.791.92.011:669.35:669.15-194

0902 2684

ACC NR: AP5027597

conclusions based on an experimental investigation of the mechanism of action of ferrite on crack formation, as well as of the general causes of crack formation, following the examination of microsections taken from welded specimens. It was found that the buildup of copper onto  $\Phi$ Kh17T monophasic ferrite steel did not result in any cracks whatsoever. Hence the hypothesis is offered that the cracks forming during the buildup of copper onto steel are produced by the combined action of the penetration of molten copper into the microfissures arising during the crystallization of the matrix phase -- steel (the Rebinder effect) -- and the attendant thermal tensile stresses. The Rebinder effect (cf. P. A. Rebinder. *Fiziko-khimicheskiye issledovaniya protsessov deformatsii tverdykh tel. Yubileyny sbornik, posvyashchenny 30-letiyu Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii. Izd. AN SSSR, 1947*) is contingent on the penetration of molten copper into the capillary microfissures and hence also on the wetting of the capillary walls. Of the two phases present in steels, the  $\gamma$ -phase (austenite) is wetted by molten copper, but the  $\alpha$ -phase (ferrite) is not. Hence, it may be assumed that the failure of cracks to propagate through the ferrite phase is due to the nonwettability of this phase with respect to copper. Further, to assess the effect of the thermal stress factor on crack formation, copper was welded onto 10 mm specimens of St.3 steel preheated to 900-950°C (above the temperature of austenite formation). In this case, the preheating reduced to a minimum the thermal tensile stresses and the formation of austenite provided favorable conditions for the penetration of copper into the microfissures. Yet no cracks were detected following the buildup. This as well as other, similar experiments which produced the same results,

Card 2/3

ACC NR: AP5027597

indicates that the Rebinder effect alone is not enough to cause crack formation: the presence of thermal tensile stresses is also a prerequisite. Further, it was established that the cleavage effect of molten copper on steel, as calculated in terms of capillary pressure, is  $\sim 2.5 \text{ kg/mm}^2$ . Orig. art. has: 4 figures, 1 formula.

SUB CODE: 11,13/ SUBM DATE: none/ ORIG REF: 006/ OTH REF: 001

Card 3/3

ACC NR: AP/005823

SOURCE CODE: UR/0181/66/008/012/3463/3466

AUTHOR: Dutchak, Ya. I.; Prokhorenko, V. Ya.; Klym, N. M.

ORG: L'vov State University im. I. Franko (L'vovskiy gosudarstvennyy universitet)

TITLE: Singularities in the structure of alloys of the tin-antimony system in the liquid state

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3463-3466

TOPIC TAGS: antimony ~~alloy~~ alloy, tin base alloy, liquid state, thermoelectric power, matter structure, carrier density

ABSTRACT: In view of the little attention paid in the past to the liquid state of the Sn-Sb system, the authors investigated by x-ray diffraction analysis the structure of a liquid alloy containing 3.8 at.% Sb, using as the structure-sensitive property the absolute thermoelectric power, which was investigated in a wide range of temperatures using 12 liquid alloys of the system. In addition, the structure of the 8.8% alloy was investigated at 255 and 415C with the aid of x-ray diffraction. The radial distribution of the atoms in the liquid alloys was determined by the Fourier method from the scattering intensity curves. At low antimony concentrations, the obtained isotherms were smooth curves, in agreement with the x-ray structure analysis, indicating that the atoms are statistically distributed. At 65 at.% Sb, corresponding to the high-temperature limit of the intermetallic  $\beta$  phase, a maximum appears on the isotherm curve. This maximum is attributed to partial retention of directional

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ACC NR: AF7005328

bonds. This assumption is confirmed by the large sensitivity of the thermoelectric power to the carrier density. It was also noted that the thermoelectric power of molten alloys with high antimony concentrations decreases with temperature. This result is connected with the highly developed covalent bonding of the antimony in the solid state and the sharp increase in the free-electron density upon melting. Orig. art. has: 3 figures, 1 formula, and 1 table.

SUB CODE: 20/ SUBM DATE: 04Jan66/ ORIG REF: 007/ OTH REF: 005

Card 2/2

USSR/ Electronics - Radio exhibitions

Card 1/1 Pub. 89 - 4/40

Authors : Berdyshev, N., Supervisor of the VORONEZH Regional DOSAAF Radio Club;  
Prokhorenkov, N., Supervisor of the KRASNODAR Radio Club; and Piskarev, A.  
Title : Exhibits of radio-amateurs' creation

Periodical : Radio 10, 6-7, Oct 1954

Abstract : A number of radio-amateurs exhibits displayed at exhibitions held in  
Voronezh, Krasnodar, and Moscow (at the Moscow Electrotechnical Institute)  
are described. Illustration.

Institution: .....

Submitted: .....

KOBASKO, N.I.; PROKHORENKO, N.I.

Effect of the rate of quenching during hardening on the formation of cracks in steel 45. Metalloved. i term. obr. met.  
no.2:53-54 F164 (MIRA 17:?)

1. Kiyevskiy zavod Stroydormash.

PROKHORENKO, N.P.

Collective grape farms of Anapa District need help. Vin.  
SSSR 15 no.3:58 '55. (MIRA 8:8)

1. Glavnyy agronom Anapskoy mashinno-traktornoy stantsii  
(Anapa District--Viticulture)

PROKHORENKO, S.A., elektrotekhnik.

~~Operation of a synchronous electric motor with excitation from~~  
the SMG-2G welding generator. Energetik 5 no.3:23 Mr '57.

(Electric motors, Synchronous)

(MLRA 10:3)

S/193/60/000/004/005/006  
A004/A001

AUTHOR: Prokhorenko, S.P.

TITLE: Semi-Automatic Installation for the Pressurized Impregnation of Electric Coils

PERIODICAL: Byulleten' tekhniko-ekonomicheskoy informatsii, 1960, No. 4, pp. 33 - 35

TEXT: The Special Design Office of the Dnepropetrovskiy zavod selenovykh vypryamiteley (Dnepropetrovsk Selenium Rectifier Plant) has developed and introduced into production a new installation for the cyclic pressurized impregnation of electric coils of apparatus operating in coal mines and being subjected to the action of dust and moisture. The operation of this installation showed that a cyclic impregnation, consisting of an alternating impregnation under normal pressure (dipping) and an impregnation under an excess pressure of 4-5 atm, ensures the penetration of the lacquer into all the coil layers, wound with enameled wire of small cross section. The installation consists of two hermetically closed horizontal tanks into which vessels with the impregnating lacquer are rolled on slides running on bedways. Containers with the coils are submerged in the lacquer. Moreover, the installation has an automatic control device. With the aid

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S/193/60/000/004/005/006  
A004/A001

#### Semi-Automatic Installation for the Pressurized Impregnation of Electric Coils

of compressed air a pressure of 4-7 atm is produced in the tanks which is held for 3-5 minutes; next the pressure is removed for 3-5 minutes, and then produced again. These alternating cycles are effected with the aid of the automatic control device and are repeated 3-5 times depending on the winding thickness of the coil and the diameter of the winding wire. After the impregnation process the coils are dried at 120°C. The figure shows a block-diagram of the automatic control device, which is built into a cabinet and consists of: the ПК2-10 (PK2-10) packaged circuit breaker, ТП (TP) step-down transformer, ВС-219 (VS-219) selenium rectifier; by-pass; РВ (RV) mechanical time relay, ТР (TR) thermo-relay, ККВ (KKV) cut-out valve, 10 atm pressure gage and pilot lamp. When the packaged PK2-10 circuit breaker is switched on, a voltage is transmitted to the VS-210 selenium rectifier via the step-down transformer. The rectified current is fed to the normally open contacts of the KKV cut-out valve button. These contacts, however, are only closed if the air pressure in the air mains is not lower than 4 atm. When the KKV contacts are closed, the current is supplied to the normally closed TR thermo-relay contacts and further to the coils of the mechanical RV relay and to the normally open RV contact in the feed circuit of the ЛК (SPK)

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S/193/60/000/004/005/006  
A004/A001

Semi-Automatic Installation for the Pressurized Impregnation of Electric Coils

solencid. After a definite time, the thermo-relay breaks the feed circuit of the coils of the mechanical RV time relay, the SPK solenoid draws in the core, switches over the by-pass and the tanks communicate with the atmosphere. When the cam disk is turned through  $60^\circ$  so that it breaks the normally open RV contacts, the SPK solenoid is disconnected and the valve, with the aid of springs, returns into its initial position. Compressed air from the mains gets into the tank and the communication of the latter with the atmosphere is cut off. The total impregnation time depends on the setting of the thermo-relay by the subsetting  $R_1$  resistor and amounts to 20-30 minutes. There is 1 figure.

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Card 3/3



PROKHORENKO, V.K.,

Notes on Lectures Published Earlier Elsewhere:	
I.S. FISHER, Contemporary State and Achievements of the Theory of Liquids	139
V.K. PROKHORENKO and I. S. FISHER, Fluctuations of the Microstructure of Simple Liquids and Water	139
A.M. YEVSLEYEV, Statistical Theory of Liquid Solutions	140
A.YE. GLAUFENMAN, On the Higher Approximations in the New Form of "plasma-like" Decompositions	141
V.M. GRIGANOVSKIY, Spectral-Method Investigation into the Structure of Non-ideal Solutions	142
A.O. BOLANIN and V.M. GRIGANOVSKIY, Investigation into Inter-molecular Interactions in Aliphatic Mercaptanes and Their Solutions by means of Infrared Absorption Spectra	142
YE.V. SHUVALOVA, On the Spectral Manifestation of the Hydrogen Bond in Some Alkines	143

STRUCTURE AND PHYSICAL PROPERTIES OF MATTER IN A LIQUID STATE  
reports read at the 4th Conference convened in KIEV from 1 to 5 June  
1959, published by the publisher House of KIEV University, KIEV,  
USSR, 1962

PROKHORENKO, V.I.

Some properties of Fourier coefficients. Vest. Mosk. un. Ser.1:  
Mat., mekh. 19 no.6:51-60 N-D '64.

(MIRA 18:2)

1. Kafedra teorii funktsiy i funktsional'nogo analiza Moskovskogo  
universiteta.

FISHER, I.Z.; PROKHORENKO, V.K.

Direct estimation of the "settled life" of an atom in an elementary liquid. Zhur. fiz. khim. 36 no.3:588-591 Mr '62.  
(MIRA 17:8)

1. Belorusskiy universitet.

FISHER, I.Z.; ZAYTSEVA, A.M.; PROKHORENKO, V.K.

Statistical thermodynamics of point electrical charges. Zhur.  
fiz.khim. 35 no.8:1877-1878 Ag '61. (MIRA 14:8)

1. Belorusskiy gosudarstvennyy universitet.  
(Dynamics of a particle)

PROKHORENKO, V.K.

Structure of the alkali metals in a liquid state. Dokl. AN BSSR  
3 no.5:194-196 My '59. (MIRA 12:10)

1. Prodstavleno akademikom AN BSSR B.I. Stepanovym.  
(Alkali metals)

PROKHORENKO, V. K., Candidate Phys-Math Sci (diss) -- "Fluctuation in the micro-structure of monoatomic liquids". Minsk, 1959. 12 pp (Min Higher Educ USSR, Beloruss State U im V. I. Lenin), 150 copies (KL, No 25, 1959, 127)

SOV/76-33-8-30/39

5(4)

AUTHORS: Prokhorenko, V. K., Fisher, I. Z.

TITLE: The Microstructure of Simple Liquids

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1852-1858 (USSR)

ABSTRACT: Some new knowledge on the microstructure of liquids can be obtained by investigations of the fluctuation of coordination numbers (FCN) (Ref 1). An interpretation of the (FCN) theory is given, and concrete calculation results are listed for some real liquids. In reference 1, the general expression (1) of the fluctuation of the particle number in a definite range G was derived which refers to a certain particle of the liquid in the point q". The calculation method to be used for the first and second coordination numbers (CN) is given, as well as the method of calculating the correlation of these two values. The two values are indicated for liquid argon (Table 1), xenon (Table 2), mercury (Table 3), and some other elements (various metals)(Table 4), and it is stated that the fluctuation of the first (CN) is, on average, at least 20%, and of the second (CN), in the order of magnitude of 50%. Thus, the fluctuation of particles becomes discernible already in the first coordination sphere of the liquids. As

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The Microstructure of Simple Liquids

SOV/76-33-8-30/39

the liquids are heated, their loosening and the undeterminability of the first (FCN) rise so that the concept of (CN) in liquids has to be considered with great care, and no analogy with the (CN) of crystals may be assumed. The value mentioned above shows that the undeterminability of the second (CN) is even greater, and can in many cases not be defined at all. The correlation of the fluctuation numbers in both coordination spheres is at all times negative and relatively high. It is stated that a quasicrystalline structure is not to be found in simple liquids, contrary to the general assumption, but that the effects of a regulated order are due to the density. The observations made are, however, in agreement with the statements made by Hildebrand on the liquid structure (Ref 14). There are 4 tables and 14 references, 5 of which are Soviet.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet Minsk  
(Belorussian State University, Minsk)

SUBMITTED: February 14, 1958

Card 2/2



FISHER, I.Z.; PROKHORENKO, V.K.

Law of distribution of coordination numbers in simple liquids.  
Dokl.AN BSSR 3 no.2:41-43 F '59. (MIRA 12:5)

1. Predstavleno akademikom AN BSSR M.A. Yel'yashevichem.  
(Coordination number)

5(4)

AUTHORS:

Prokhorenko, V. K., Samoylov, O. Ya. SOV/20-125-2-33/64  
Fisher, I. Z.

TITLE:

Asymmetry in the Distribution of the  
Coordination Number of Molecules in Water  
(Ob asimmetrii raspredeleniya koordinatsionnogo  
chisla molekul v vode)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 2,  
pp 356-358 (USSR)

ABSTRACT:

The investigation of the coordination numbers of liquid particles leads to the problem of determining the distribution function of the probabilities  $w(z)$  of the coordination numbers  $z(z = 0, 1, 2, \dots)$  in concrete liquids. If this distribution is a Gaussian one or if it is sufficiently similar to a Gauss distribution, it is necessary, for the construction of  $w(z)$ , to know only  $\bar{z}$  and  $\overline{(\Delta z)^2}$ . However,  $w(z)$  is probably in reality not so symmetric as Gauss distribution, and this fact may be of essential importance in order to be able to understand the microstructure of the liquid. Possibly, it is

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Asymmetry in the Distribution of the  
Coordination Number of Molecules in Water

SOV/20-125-2-33/64

necessary that, in the case of liquids with sufficiently close molecular structure, the fluctuations of the coordination number towards a decrease of this number and in the case of a less close molecular structure those towards an increase of this number predominate. Special interest is caused by the extremely fine structure of the water. At present the fact has been established with sufficient certainty that in water, in the sense of the short range order, the structure of the ice remains essentially conserved. Reference is made to several earlier papers dealing with this problem. The authors then carry out a quantitative determination of the asymmetry of the fluctuations of the coordination numbers. The quantities  $\bar{z}$  and  $(\Delta z)^2$  are assumed as being known. Next, the sign and the approximate amount of asymmetry of the distribution  $w(z)$  is determined by the sign and by  $(\Delta z)^3$ . For the accurate computation of  $(\Delta z)^3$  it is necessary to know the fourth correlative function  $F_4(q, q', q'', q''')$  of the liquid particles, whereas from the radiographic data only the binary function

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Asymmetry in the Distribution of the  
Coordination Number of Molecules in Water

SOV/20-125-2-33/64

$F_2(q, q')$  can be determined. The authors therefore refrain from carrying out an exact computation, and instead of determining  $(\Delta z)^3$ , they determine  $(\Delta N)^3$ , - the average cubic deviation of the number of particles from their average value in a certain arbitrarily located liquid volume, which is as great as the volume occupied by the selected liquid particle and its first coordination sphere. By such a modification the problem will hardly be essentially distorted. In this case the rule  $(\Delta N)^3 < 0$  must apply. For the evaluation of the value and sign of  $(\Delta N)^3$  it is necessary by approximation to use the known semi-thermodynamical theory of fluctuations which is based upon the Boltzmann principle. However, when expanding the thermodynamic potential in a series with respect to the powers of the deviation  $\Delta v$ , it is necessary, besides the quadratic terms  $(\Delta v)^2$ , to take also the higher terms into account. The distribution of the volume fluctuations or the number of particles is then no longer Gaussian. There follows a rigorous

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On the Asymmetry of the Distribution of the  
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statistical evaluation of  $(\Delta N)^3$ . The corresponding  
operations supply negative two-figure values of  $(\Delta N)^3$   
for two tightly packed liquids, viz. argon and mercury, near  
melting temperature. This also corresponds to the results of  
the above-mentioned semi-thermodynamical theory. For water,  
 $(\Delta N)^3 > 0$  is found in all cases;  $(\Delta N)^3$  decreases with  
increasing temperature. There are 1 table and 11 references,  
7 of which are Soviet.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova  
Akademii nauk SSSR (Institute of General and Inorganic  
Chemistry imeni N. S. Kurnakov of the Academy of Sciences, USSR)  
Beloruskiy gosudarstvennyy universitet im. V. I. Lenina  
(Belorussian State University imeni V. I. Lenin)

PRESENTED: December 10, 1958, by I. I. Chernyayev, Academician

SUBMITTED: December 2, 1958  
Card 4/4

21(1)

AUTHORS: Prokhorenko, V. K., Fisher, I. Z. SOV/56-36-4-54/70

TITLE: The Fluctuations of Atomic Structure in Liquid Helium  
(Fluktuatsii atomnoy struktury v zhidkom gelii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,  
Vol 36, Nr 4, pp 1311-1312 (USSR)

ABSTRACT: In connection with the results obtained from reference 1 (investigation of the atomic structure of liquid helium by the method of the scattering of slow neutrons - it is shown that the atomic structure in the range 2-5° K is hardly sensitive at all to temperature variations and does not vary during passage through  $\lambda$ -point) as well as with those of one of the authors' earlier papers (Ref 2) the present "Letter to the Editor" investigates the fluctuation of the average structure by using equation (1) derived in reference 2. Equation (1) runs as follows:

$$(\delta z)^2 \equiv \overline{(\Delta z)^2} = \bar{z} + \frac{8\pi^2}{v^2} \int_0^{r_1} \int_0^{r_1} g(r)g(\varphi) \left\{ \int_{|r-\varphi|}^{r+\varphi} (g(t) - 1)t dt \right\} r dr d\varphi$$

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The Fluctuations of Atomic Structure in Liquid Helium SOV/56-36-4-54/70

$(\delta z)^2$  denotes the square of the fluctuations of the coordinate number, the mean value of which obeys the expression

$$\bar{z} = \frac{4\pi}{v} \int_0^{r_1} g(r)r^2 dr; \quad g(r) \text{ denotes the radial distribution}$$

function,  $v$  the average space of a particle,  $r_1$  the abscissa of the first minimum of  $g(r)$ . For the calculation of  $\delta(z)$  the experimentally determined function  $g(r)$  of  $\delta(z)$  (Ref 1) is used. For  $r_1 = 4.6 \text{ \AA}$  &  $8.4$  results for  $\bar{z}$  (which agrees well with the values obtained in reference 1 by means of another method), and for  $\delta z$  1.47 is obtained. For the root-mean-square fluctuation of  $z$  about 18 % is found, a value that appears to be somewhat low. The distribution curve  $W(z)$  has a somewhat Gaussian shape (cf. figure p 1312). There are 1 figure and 2 references, 1 of which is Soviet.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet (Belorussian State University)

SUBMITTED: December 18, 1958  
Card 2/2

5(4)

AUTHORS: Fisher, I. Z., Prokhorenko, V. K. SOV/20-123-1-35/56

TITLE: On the Structure of Water (O struktura vody)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 1, pp 131-132 (USSR)

ABSTRACT: The most reliable and direct data concerning the structure of liquids can be obtained by the investigation of the scattering of X-rays by liquids. For this purpose the radial distribution function  $g(r)$  of the atoms is calculated from the angular dependence of scattering intensity. According to the authors' opinion, the fluctuations of the coordination numbers are not less characteristic of the structure of the liquid than the coordination numbers themselves. They are suited as a direct measure of the deviation of the local structure of a given liquid on the structure of the corresponding crystal. A particularly interesting problem is that of the structure of water. By means of the equations derived in one of their earlier papers (Ref 1) the authors calculated the first 2 coordination numbers of oxygen atoms in water and also the correlation between the fluctuations of these two coordination numbers.

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On the Structure of Water

SOV/20-123-1-35/56

For these calculations the experimentally obtained radial distribution functions for water at low temperatures (Ref 2) were used. The results obtained by calculations for the first coordination number are given in a table. The second table shows the results obtained by similar calculations for the weak peak of  $4\pi r^2 g(r)$  existing at low temperatures in the domain  $r \sim 3.6 \text{ \AA}$ , which originates from the dislocated atoms which penetrated into the cavities of water structure. According to the results shown by these two tables, the fluctuations of the two coordination numbers are about equal and, in addition, very large. The fluctuations of the orders in water probably have a fine structure. From the experimental curves  $4\pi r^2 g(r)$  it is possible also to sort out a "normal" second coordination sphere in the domain approximately between  $r = 3.9 \text{ \AA}$  and  $r = 5.7 \text{ \AA}$ , which corresponds satisfactorily with the coordination of water molecules in ice. Water is also not more "quasicrystalline" than other simple liquids. This fully agrees with the comparatively low value of the coefficient of the internal viscosity of water. The results obtained correspond well with the ideas expressed by O. Ya. Samoylov with respect to the

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On the Structure of Water

SOV/20-123-1-35/5

influence exercised by temperature on the structure of water and concerning the considerable influence exercised by the motion of translation upon the structure and the physical as well as the physico-chemical properties of water. The fluctuations of the first coordination number are suited to be used as a direct measure of the intensity translation of the molecules of the liquid from the mean into new equilibria as a result of thermal motion. The part played by the molecules shifted by translation is very considerable in the case of water. The authors thank O. Ya. Samoylov for his useful discussion of the results obtained. There are 2 tables and 5 references, 4 of which are Soviet.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina  
(Belorussian State University imeni V. I. Lenin)

PRESENTED: June 26, 1958, by I. I. Chernyayev, Academician

SUBMITTED: June 23, 1958

Card 3/3

KUZ'MICH, V.I.; PROKHORENKO, V.K.; SAMOYLOV, O.Ya.; FISHER, I.Z.

Temperature dependence of coördination numbers of particles in  
liquid solutions. Dokl. AN SSSR 141 no.2:400-401 N '61.  
(MIRA 14:11)

1. Belorusskiy gosudarstvennyy universitet im. V.I.Lenina i  
Institut obshchey i neorganicheskoy khimii im. N.S.Kurnakova  
AN SSSR. Predstavleno akademikom I.I.Chernyayevym.  
(Solution (Chemistry)) (Dynamics of a particle)

BOGDANOVICH, Boris Mikhaylovich, kand. tekhn. nauk; PROKHORENKO,  
V.K., spets. red.; SHEVCHAK, G.I., red.

[Fundamentals of the theory of the design of transistor  
radio receivers with low noise coefficients] Osnovy teorii  
i rascheta tranzistornykh radiopriemnikov s malym koef-  
fitsientom shuma. Minsk, Nauchno-tekhn. ob-vo radiotekh-  
niki i elektrosviazi im. A.S.Popova, 1962. 69 p.  
(MIRA 17:3)

*PROKHORENKO, V.K.*  
PROKHORENKO, V.K.; FISHER, I.Z.

Fluctuation of the coordination number in simple liquids.

Zhur.fiz.khim. 31 no.9:2145-2146 S '57.

(MIRA 11:1)

1. Belorusskiy gosudarstvennyy universitet, Minsk.  
(Liquids)

PROKHORENKO, V., kuznets pervogo klassa; FEL'IMAN, I.I., kandidat tekhnicheskikh nauk, dotsent, konsul'tant; KRIVITSKIY, V.I., inzhener, konsul'tant; POSPELOV, V., redaktor; RAKOVA, I., tekhnicheskii redaktor

[In the forge shop of a tractor factory] V kuznitse traktornogo zavoda. [Moskva] Izd-vo VTsSPS Profizdat, 1953. 33 p. (MLRA 7:10)

1. Traktornyy zavod im. Ordzhonikidze (for Prokhorenko)  
(Tractor industry) (Forging)

PROKHOR ENFO, V. A.

ESP.  
..R03113

EKONOMIT' METALL NA KAZHDEY DETALI (KHARKOV) KHAR'KOVSKOYE KRIZHNOGAZETNOYE  
IZD-VO, 1953. 42 p. ILLUS., DIAGRS.

ASNIS, Ye.A.; PROKHORENKO, V.M.

Peculiarities of the welding of copper to 18-8 type chromium-nickel austenitic steels. Avtom. svar. 16 no.7:86-89 J1 '63.  
(MIRA 16:8)

1. Kiyevskiy zavod "Boi'shevik."  
(Copper--Welding)  
(Chromium-nickel steel--Welding)



43555

S/126/62/014/005/013/015  
E073/E535

84-0000

AUTHORS: Dutchak, Ya. I., Stets'kiv, O.P. and Prokhorenko, V.Ya.  
TITLE: On the thermo e.m.f. of liquid couples  
PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.5, 1962, 789-791

TEXT: The following liquid couples were investigated: Pb-Sn, Sb-Bi, Pb-Cd, Pb-Bi, Sn-Cd, Sn-eutectic alloy lead/bismuth, in the temperature range between 380 to 820°C. The authors assumed that  $E$  consists of two components: the contact component due to the temperature dependence of the contact potential difference and the volume component due to diffusion of the current carriers from the hot to the cold joint:

$$E = \left( \frac{\partial E_c}{\partial T} + \frac{\partial E_o}{\partial T} \right) \Delta T \quad (2)$$

where  $\Delta T$  - difference between the temperatures of the hot and cold joints,  $E_c$  - contact potential difference. The thermo e.m.f. was measured on couples produced from two quartz tubes of 1.5 to 2 mm dia. into which the investigated metals or alloys were placed

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On the thermo e.m.f. of liquid couples S/126/62/014/005/013/015  
E073/E535

and the contact with the liquid thermocouple was by means of Araco iron, which is stable in the metals and alloys being investigated. The thermo e.m.f. was measured by a compensation method in a twin furnace, the top part of which served for maintaining constant the temperature of the "cold" joint. For Pb-Sn and Sn-Cd couples, the thermo e.m.f. increased up to the temperatures of 520 and 490°C, respectively. A further temperature increase brought about a drop in the thermo e.m.f. In the Pb-Sn couple the lead was positive up to about 585°C, then the sign of the thermo e.m.f. changed; in the Sn-Cd couple the change in sign occurred at about 650°C. In Pb-Sn couples there is a change of sign twice, since in the solid state tin has a positive polarity. In Sb-Bi thermocouples the thermo e.m.f. increases continuously but there is a bend in the temperature range 700 to 728°C. A similar pattern was observed for Pb-Bi couples. The thermo e.m.f. of tin-eutectic Pb-Bi couples decreases with temperature and there is a change of sign at 590°C, i.e. the Pb-Bi eutectic alloy becomes positive. The temperature of the "cold" joint was 360°C for the Pb-Sn couple, 380°C for the Sn-Cd couple, 665°C for the Sb-Bi, 400°C for the

Card 2/3

On the thermo e.m.f. of liquid couples S/126/62/014/005/013/015  
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Pb-Bi and 235°C for the Sn-eutectic Pb-Bi. There are 5 figures.

ASSOCIATION: L'vovskiy ordena Lenina gosudarstvennyy universitet  
imeni Iv. Franko  
(L'vov Lenin Order State University imeni Iv. Franko)

SUBMITTED: March 20, 1962

Card 3/3

L 23115-56 EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t) IJP(c) JD/WW/JG  
 ACC NR: AP6006863 SOURCE CODE: UR/0181/66/008/002/0598/0599

AUTHOR: Dutchak, Ya. I.; Prokhorenko, V. Ya.; Klym, N. M.; Gadzevich, K. Ye. <sup>68</sup> <sub>13</sub>

ORG: L'vov State University im. Iv. Franko (L'vovskiy gosudarstvennyy universitet)

TITLE: Structure and electric properties of alloys of the systems indium-gallium and gallium-tin in the regions of melting and the liquid state

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 598-599

TOPIC TAGS: indium alloy, gallium alloy, tin alloy, alloy phase diagram, alloy system, thermoelectric power, electric resistance, x ray diffraction analysis

ABSTRACT: To obtain quantitative data on the structure of the liquid alloys the authors have measured the concentration dependence of the absolute thermoelectric power and of the electric resistivity of 15 alloys of different compositions for each system. From an analysis of the plotted results, in conjunction with the plots of the state diagrams, it is concluded that in the case of the gallium-tin system the eutectic composition is transformed into a physical solution with statistical distribution of atoms of different sorts at temperatures below 50C. For the indium-gallium system, the statistical distribution of the atoms is characterized at temperatures on the order of 80C. These conclusions are in full agreement

Card 1/2

L 23115-66

ACC NR: AP6006863

with results of x-ray diffraction analysis. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 08Jul65/ ORIG REF: 007

Card 2/2 *BLC*

Card 1/2

L 63343-65

ACCESSION NR: AP5017285

2

solidus line, the thermal emf increases smoothly for most alloys (except eutectic, when a decrease is observed) with the change in the thermal emf in the vicinity of the solidus line being proportional to the bismuth content of the alloy. The absolute thermal emf experiences some deviation after reaching a fixed temperature

University)

SUBMITTED: 30 Nov 64

ENCL: 00

SUB CODE: MM, EM

NO REF SOV: 009

OTHER: 001

ATD PRESS: 4055

Card 2/2

L 5389-65 EWT(d)/EWT(1)/EWT(m)/EWP(w)/EWG(m)/EWA(d)/EWP(v)/EPR/T/EWP(1)  
EWP(h)/EWG(c)/EWP(b)/EWP(1) Pz-6/Pf-4/Ps-4 IJP(c) JD/AT

ACCESSION NR: AP5015944

UB/0285/65/000/001/0129/0430

AUTHOR: Prokhorenko, V. Ya.

40  
B

TITLE: Device for studying the thermoelectric properties of materials. Class 42, No. 169872

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 129-130

TOPIC TAGS: thermoelectric property, thermoelectric equipment

ABSTRACT: This Author Certificate presents a device for studying the thermoelectric properties of materials in a heating oven. It contains a crucible with a lid through which microthermocouples in protective jackets pass (see Fig. 1 on the Enclosure). To obtain small and constant magnitude temperature gradients at the sample in the whole temperature range to be investigated, the device has a heat transfer unit with fine and coarse control of the heat transfer. The control is accomplished by changing the depth of its immersion into the melt and by



changing the size of its radiative surface with removable radiators. Page 1  
has: 1 diagram.

ASSOCIATION: Gosudarstvennoye konstruktorskoye byuro "Termopribor" (State Design  
Bureau "Thermal Apparatus")

Card 1/3

L 45369-85

ACCESSION NR: AP5010944

SUBMITTED: 24Feb64

ENCL: 01

SUB CODE: TD, EE

NO REF SOV: 000

OTHER: 000

DUTCHAK, Ya.I.; PROKHORENKO, V.Ya.

Effect of small additions of copper on the thermoelectric properties of cadmium-bismuth alloys (27% Bi) in the solid and liquid states. Fiz. tver. tela 6 no.10:3172-3174 9 '64. (MIRA 17-18)

I. I'vovskiy Ordona Ienina gosudarstvennyy universitet in. Iv. Franko.

LAKH, V.I.; PROKHORENKO, V.Ya.; TEREBUKH, L.S.; KISLYY, P.S.; PANASYUK,  
A.D.; SAMSONOV, G.V.

Temperature measurement of the atmosphere of an aluminum  
electrolysis cell. TSvet. met. 34 no.8:38-40 Ag '61. (MIRA 14:9)  
(Aluminum—Electrometallurgy)

L 10364-65 EWT(1)/EWG(k)/EWT(m)/EPR/EEC(b)-2/ENP(k)/EPA(bb)-2/ENP(b) Pz-6/  
PF-4/PS-4 LJP(c)/ESD[gs)/RAEM(t) JD/WB/AT  
ACCESSION NR: AP4046646 S/0181/64/006/010/3172/3174

AUTHORS: Dutchak, Ya. I.; Prokhorenko, V. Ya.

TITLE: Effect of small additions of copper on the thermoelectric properties of cadmium-bismuth (27% Bi) alloys in the solid and liquid states

SOURCE: Fizika tverdogo tela, v. 6, no. 10, 1964, 3172-3174

TOPIC TAGS: cadmium alloy, bismuth, copper, thermoelectric property, thermal emf, temperature dependence, solid state, liquid state

ABSTRACT: The thermal emf  $\alpha$  was measured by a method in which a special unit, made from a corrosion-stable metal not interacting with thermal conductivity, was immersed